WHAT IS CLAIMED IS:

1. A method of treating vulnerable plaque, comprising:

a) positioning a wingless balloon of a balloon catheter in a portion of a body lumen having a vulnerable plaque; and

b) inflating the wingless balloon, to expand the balloon from a wingless unexpanded diameter to an expanded diameter, to intentionally damage or rupture the vulnerable plaque.

2. The method of claim 1 including determining a diameter of the portion of the body lumen having the vulnerable plaque, so that the balloon expands to a preselected expanded diameter selected to correspond to the diameter of the portion of the body lumen having the vulnerable plaque and into contact with a wall defining the portion of the body lumen having the vulnerable plaque to thereby damage or rupture the vulnerable plaque without damaging the body lumen wall adjacent to the vulnerable plaque.

3. The method of claim 2 wherein the balloon is expanded to a diameter sufficient to compress the vulnerable plaque.

4. The method of claim 1 including delivering an antithrombotic agent within the body lumen.

5. The method of claim 2 wherein the balloon has a highly compliant radial expansion up to a nominal expanded diameter within a first inflation

pressure range, and a low compliant radial expansion within a second higher inflation pressure range.

6. The method of claim 5 wherein the balloon has at least one layer formed of a polymeric material selected from the group consisting of expanded polytetrafluoroethylene, and expanded ultrahigh molecular weight polyolefin, and the balloon is inflated at an inflation pressure within the second higher inflation pressure range.

7. The method of claim 6 wherein the balloon is inflated at an inflation pressure of about 10 atm to about 20 atm.

8. The method of claim 6 wherein the at least one layer of expanded polytetrafluoroethylene, and expanded ultrahigh molecular weight polyolefin is porous with an antithrombotic agent within the pores, and b) includes delivering the antithrombotic agent within the body lumen.

9. The method of claim 5 wherein the balloon expands to an expanded diameter of about 2% to about 15% greater than the nominal diameter within the second, higher inflation pressure range, and b) comprises inflating the balloon at an inflation pressure within the second inflation pressure range.

10. The method of claim 1 wherein b) comprises inflating the wingless balloon using a diameter-limiting inflation device.

11. A method of treating vulnerable plaque, comprising:

a) determining a diameter of a portion of a body lumen having a vulnerable plaque;

b) positioning a wingless balloon of a balloon catheter in the portion of the body lumen having a vulnerable plaque, the balloon having at least a layer formed of a polymeric material selected from the group consisting of expanded polytetrafluoroethylene, and expanded ultrahigh molecular weight polyethylene, and having a highly compliant radial expansion up to a preselected expanded diameter within a first inflation pressure range, and a low compliant radial expansion within a second higher inflation pressure range; and

c) inflating the wingless balloon at an inflation pressure within the second higher inflation pressure range, to expand the balloon to an expanded diameter selected to correspond to the diameter of the portion of the body lumen having the vulnerable plaque and into contact with a wall defining the portion of the body lumen having the vulnerable plaque, to thereby damage or rupture the vulnerable plaque without damaging the body lumen wall adjacent to the vulnerable plaque.

12. The method of claim 11 wherein the balloon is expanded to a diameter sufficient to compress the vulnerable plaque, and thereby induce extracellular matrix synthesis in the vulnerable plaque to strengthen a fibrous cap of the vulnerable plaque.

13. A method of treating vulnerable plaque, comprising:

a) positioning a wingless balloon of a balloon catheter in a portion of a body lumen having a vulnerable plaque; and

b) inflating the wingless balloon using a diameter-limiting inflation device, to expand the balloon from a wingless unexpanded diameter to an expanded diameter, to intentionally damage or rupture the vulnerable plaque.

14. The method of claim 13 wherein the diameter-limiting inflation device limits the inflation pressure in the balloon.

15. The method of claim 13 wherein the diameter-limiting device is pressure relief valve within a proximal adapter of the balloon catheter, which limits the pressure in the balloon to about 4 to about 10 atm.

16. The method of claim 13 including delivering an antithrombotic agent within the body lumen.

17. The method of claim 13 wherein the balloon expands to the working, nominal outer diameter with a highly compliant radial expansion within the working pressure range of the balloon.

18. The method of claim 17 wherein the outer diameter of the balloon increases by about 40% to about 400% of an uninflated outer diameter of the balloon within the working inflation pressure range of the balloon.

19. The method of claim 13 wherein the balloon is formed of a polymeric material selected from the group consisting of polyurethane elastomers, silicone polyurethanes, segmented polyamide block copolymers, segmented polyester block copolymers, styrene butadiene rubber, and radiation crosslinked polyolefinic elastomers.